REMARKS

Reconsideration is requested.

Claims 1-8, 11-13, 20-28 and 30-35 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,792,337 to Padovani et al., in view of U.S. Patent No. 6,529,127 to Townsend et al.

Claims 9-10, 14-19 and 29 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,792,337 to Padovani et al., in view of U.S. Patent No. 6,529,127 to Townsend et al., and further in view of U.S. Patent No. 4,656,463 to Anders et al.

Claims 28 and 34-35 stand rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,792,337 to Padovani et al.

Claim 1, as amended, recites a wireless sensor system, comprising a reader apparatus configured to generate an induction field; a sensor apparatus configured to monitor structural integrity of an object, the sensor apparatus being communicatively linked to the reader apparatus and in a passive state until energized by the reader apparatus, the sensor apparatus including: processing circuitry; a resonant antenna configured to communicate data between the sensor apparatus and the reader apparatus, the resonant antenna being configured to collect energy from the induction field to energize the sensor apparatus; a plurality of sensors, the sensors being respectively configured to measure predetermined parameters of the object, and to be independently interrogated by the reader apparatus, measurements obtained by the individual sensors being transmitted via a response signal to the reader apparatus via the resonant antenna, the response signal being superimposed on the return induction field; circuitry configured to store energy collected from the induction field to provide power to the sensor apparatus, including two capacitor banks, one of the capacitor banks being configured to provide power for short-term operations and the other of the capacitor banks

being configured to provide power for extended operations, and being configured to accumulate energy while measurements are being made by the plurality of sensors; and the reader apparatus including: a transceiver configured to communicate with the sensor apparatus; an antenna having a loop with a diameter above 66 inches, the loop being formed of multi-strand wires; a modem configured to selectively transfer data from the reader apparatus to a remote site; and a microprocessor configured to control operations of the reader apparatus, and the individual sensors of the sensor apparatus being independently interrogated by the microprocessor, in operation.

Claim 1 distinguishes over the prior art for a number of reasons.

First, neither the Padovani et al. reference nor the Townsend et al. reference teaches or suggests circuitry including at least two capacitor banks, one of the capacitor banks providing power for short-term operations and the other capacitor bank providing power for extended operations.

An advantage of Applicants' construction is that it allows sensors, which may consume a large amount of power, to collect data for a long amount of time after power from the reader has been withdrawn, for example.

Second, neither the Padovani et al. reference nor the Townsend et al. reference teaches or suggests a reader apparatus that includes an antenna having a loop with a diameter above 66 inches, the loop being formed of multi-strand wires.

This provides a large amount of coverage for multiple platforms. Due to the multistrand wire in the loops, high current/high amplitude magnetic fields can be generated providing an extended working range on the order of several feet into soil, for example. The Townsend et al. reference instead discloses an exciter coil 28 having 3.5 turns 1 inch diameter of #16 A.W.G. magnet wire.

Third, neither the Padovani et al. reference nor the Townsend et al. reference teaches or suggests a modem configured to selectively transfer data from the reader apparatus to a remote site.

This allows remote data logging at an office miles away.

In rejecting claims 9-10, 14-19, and 29, the Examiner combined U.S. Patent No. 4,656,463 to Anders et al. with Padovani et al. and Townsend et al. While the Anders et al. reference may disclose one capacitor bank, it does not disclose two capacitor banks.

It would not be obvious to combine the Anders et al. reference with the Padovani et al. and Townsend et al. references because there is no teaching in the cited references of how the components should be combined or of which components of Anders et al. should be selected and substituted for portions of the structure of Padovani et al. or Townsend et al. There are no teachings in the cited references that there would be any advantage resulting from selecting portions of the structure of Anders et al. and electrically integrating that structure somehow into the structure of Padovani et al. and Townsend et al. The mere fact that the structures of the references could be somehow modified to result in the claimed structure does not render the claimed structure obvious unless the references suggest the desirability of the modification.

Further, while the Anders et al. reference may disclose a capacitance bank unit in Fig. 7, it does not disclose the use of two capacitor banks. They specifically disclose, in Col. 26, that the output of the code unit 99 must have a special code for service space. The service space code will be sent to the "distant range" unit 101 which causes additional capacitors of the capacitance bank unit 102 to be discharged and the power to the transmitting unit 95 to be increased. Therefore, if the Anders et al. reference were to be combined with the Padovani et al. reference and the Townsend et al. reference, one of ordinary skill in the art would be motivated to add any additional capacitors to the first capacitor bank, not to a new capacitor bank of unspecified purpose. There is nothing in the prior art of record that suggests using one of the capacitor banks providing power for short-term operations and another capacitor bank providing power for extended operations, as required by

claim 1. If the Examiner continues to maintain that it would be obvious to add a second capacitor bank to a combination of Padovani et al., Townsend et al., and Anders et al., citation of prior art or an affidavit in accordance with MPEP §707(d)(2) supporting the proposition is requested, as the Examiner is apparently relying on personal knowledge.

Therefore, claim 1 is allowable. Claim 9 has been amended in view of the amendments to claim 1, and claim 10 has been cancelled.

As claims 2-9 depend on claim 1, they too are allowable.

Claim 11, as amended, recites a wireless sensor system, comprising a passive sensor apparatus configured to be embedded within a concrete structure to monitor infiltration of contaminants into the structure, the sensor apparatus including energy storing circuitry having two capacitor banks, one of the capacitor banks being configured to provide power for short-term operations and the other of the capacitor banks being configured to provide power for extended operations, and the sensor apparatus further including a plurality of sensors respectively configured to measure environmental parameters of the structure including information related to the infiltration of contaminants into the structure; and a reader apparatus communicatively coupled to the sensor apparatus, the reader apparatus being configured to provide power to the energy storing circuitry during communications with the sensor apparatus, the reader apparatus being configured to independently interrogate individual ones of the sensors to obtain information measured by the individual sensors, and the reader apparatus being configured to generate an induction field to energize the sensor apparatus, and information measured by the sensor apparatus is transmitted to the reader apparatus via a response signal.

Neither the Padovani et al. reference nor the Townsend et al. reference teaches or suggests a sensor apparatus including energy storing circuitry having two capacitor banks, one of the capacitor

banks being configured to provide power for short-term operations and the other of the capacitor banks being configured to provide power for extended operations, in combination with the other limitations of claim 11.

Therefore, claim 11 is allowable.

As claims 12-21 depend on claim 11, they too are allowable.

Claim 28, as amended, recites a method of monitoring structural integrity of a structure, comprising embedding a passive wireless sensor platform apparatus within the structure to monitor infiltration of contaminant materials into the structure; communicatively coupling a reader apparatus to the sensor apparatus; configuring the reader apparatus to communicate with the sensor apparatus via short range telemetry communication; energizing the sensor apparatus via an induction field generated by the reader apparatus, wherein the sensor apparatus is in a passive state until energized by the reader apparatus; monitoring the infiltration and obtaining corresponding measurements upon receiving an indication for the monitoring from one of the reader apparatus, or a processing circuitry of the sensor apparatus; transmitting the measurements to the reader apparatus in a response signal; and communicating the measurements from the reader apparatus to a remote location using a modem.

Neither the Padovani et al. reference nor the Townsend et al. reference teaches or suggests communicating the measurements from the reader apparatus to a remote location using a modem, in combination with the other limitations of claim 28.

Therefore, claim 28 is allowable.

As claims 29-35 depend on claim 28, they too are allowable.

Various claims have been amended to change "charging circuitry" to --energy storing circuitry--. These amendments are merely for increased clarity.

In view of the foregoing, allowance of claims 1-9 and 11-35 is requested.

This application is believed to be in immediate condition for allowance, and action to that end is requested. Should the next Action be anything other than a Notice of Allowance, a telephonic interview is requested.

Respectfully submitted,

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